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Detroit City Plan and Improvement Commission

Report No. 1, Revised

December, 1914

City Tree Planting

The Selection, Planting and Care of Trees
along City Thoroughfares

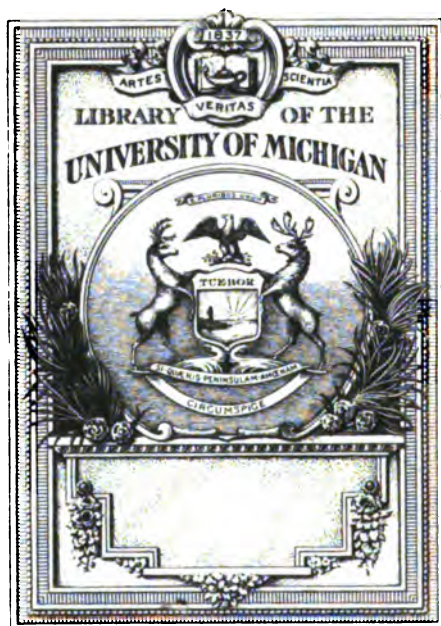
By T. GLENN PHILLIPS

Landscape Architect

Member of American Society of Landscape Architects

DETROIT

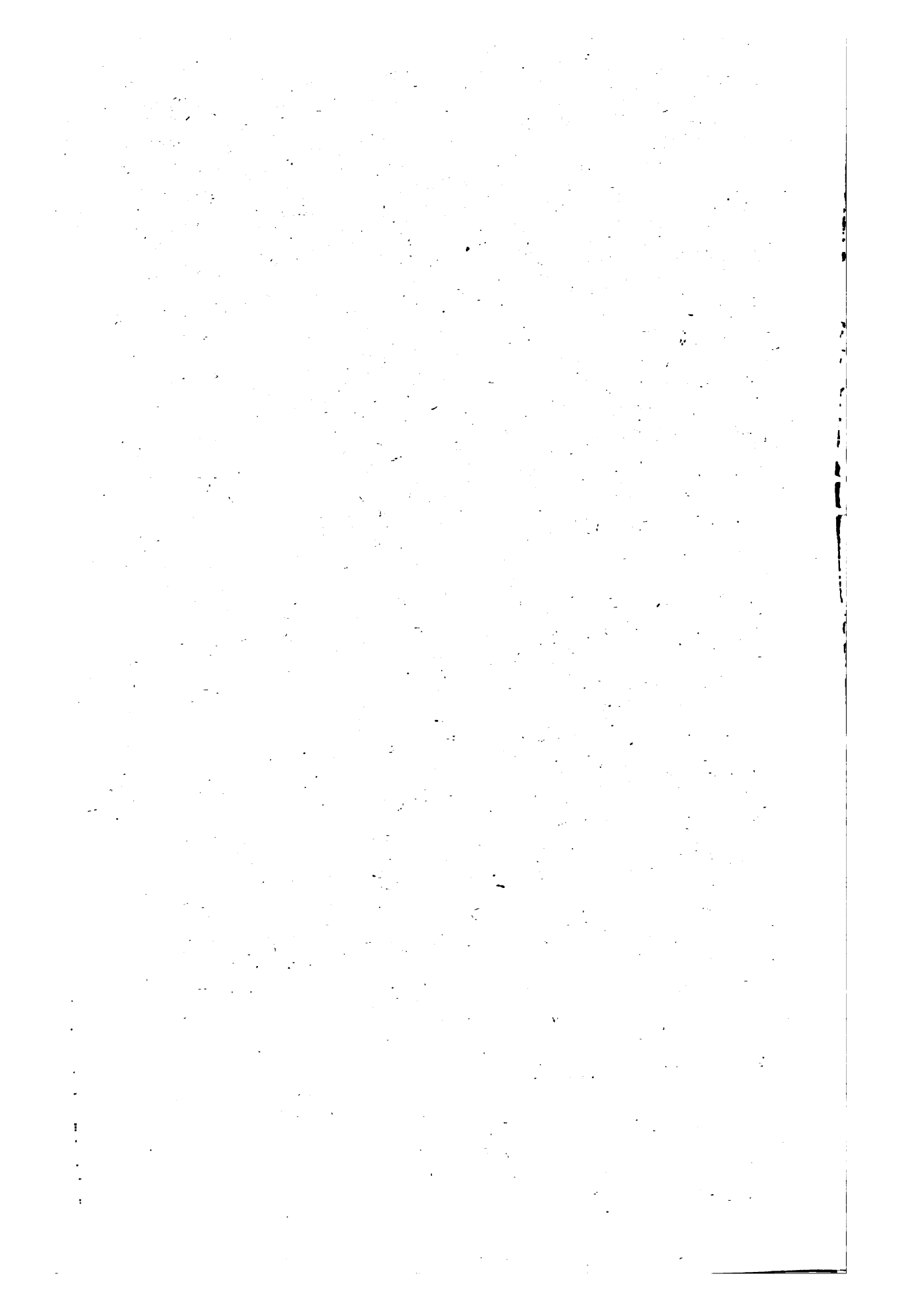
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**The Selection, Planting and Care of Trees
along City Thoroughfares**

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**Detroit City Plan and Improvement
Commission**

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**THE COMMISSIONER OF PARKS AND
BOULEVARDS**

THE COMMISSIONER OF PUBLIC WORKS
THE CITY ENGINEER

City Tree Planting

The recent tardy recognition on the part of the United States of the genius of that great engineer, L'Enfant, who under the direction of the first President, Washington, laid out the city of that name, brings at this time direct attention again to the beauty of the city of Washington, and when that beauty is analyzed a very large proportion of it is in the location and the planting, particularly with trees, of the parkways, and the wonderfully intelligent addition of trees throughout all the streets.

CHARLES R. LAMB.

ANCIENT and universal, as is the practice of tree planting, the effective use and selection of trees for street use is a matter very little understood. Even with the increase of pretention and achievement in the city-building of modern times, the arrangement and selection of the trees planted along our thoroughfares has not received study and attention commensurate with its importance. This is more true in America than in Europe, where the French and German city-builders are ahead of us in this respect, just as they are in the architectural and the engineering design of city ways and formal open places. This is due to the fact that nine-tenths of our city street design and construction here in America is in the hands of untrained men. Our planting is almost always the work of nurserymen or gardeners, while the majority of our road engineers have been trained as civil engineers only.

European
inspiration.

The only original type of street planting which we seemed to have worked out with any degree of success in America is the planting of native elms and maples along our village streets, and often the spacing was altogether too close for best effects. This was more the result of chance than of design. Being familiar with the elm and maple as a street tree in the older country, our forefathers in New England planted these trees along their wide streets and village greens. The American elm, which is a larger and more beautifully picturesque tree than its English brother, was used, and these streets, in the course of a century or so, presented a truly magnificent sight.

Original
type of
planting in
America.

Use of
American
Elm.

The result has been that ever since we have sought to reproduce these elm and maple-lined New England streets and even as our towns have grown to cities, we have followed this custom blindly, never pausing to think that conditions became rapidly and radically different. Today, although we may have many beautiful elm-shaded streets, we have, particularly in New England, many more wherein the tree planting consists of but broken lines of dead or dying elms, owing to the ravaging attack of the Elm-leaf beetle. In these infested sections their persistence continues in spite of all preventative measures, and planters are abandoning the use of the American elm.

Other tree planting.

Besides the elm and maple other kinds of trees, likewise successful on village or country roads, have been experimented with in a more or less hap-hazard way without any great success. However, on our boulevards and parkways, the trees generally have done well; and yet, with this very evident lesson, that different situations demand different types of tree planting, it is only the professional city-builders, landscape architects, and foresters who have given the subject serious consideration.

TYPES OF STREET TREE PLANTING.

Street types.

There are three general types of tree planting which may be applied to streets:

- (1) The overarching type, where trees, such as the American elm, are used to form a canopy over a street.
- (2) The avenue type, where straight or formal trees are used, producing vistas.
- (3) The decorative type, where small trees are used, forming decorative lines along the facades of the buildings.

The different kinds of streets to which these various forms of planting may be applied, we will classify roughly into five general classes:

- (1) Business streets.
- (2) Streets in business districts, but of a special esthetic value in the city plan, generally formal avenues.
- (3) Residential streets.
- (4) Parkway and boulevards.
- (5) Outlying roads of approach. Suburban or country roads.

In each of these classes, the tree planting should be influenced by the nature of the street, the effect desired and the possibilities of trees under the existing conditions.

First. Business Streets. In streets of this class space is limited and traffic large, and as a result the whole surface of the street is paved. The buildings are high and continuous. Adverse conditions in the shape of dust, smoke, gas and wires abound overhead, while sewers, foundations, gas mains and subways encroach upon the natural soil conditions underground. Hence, trees which must have a large space for root-spread, and receive water over a large area, obviously cannot survive and should not be used.

(1)
Business streets.

Adversal conditions.

Elms, oaks and maples are trees of this class. Their size is against their use, as between high buildings they form an umbrella-like shade which shuts out light and air, making the streets dark and unsanitary. Also such trees have a very high rate of mortality which does not come, unfortunately, until the trees are nearly mature, so that we get serious breaks in the tree lines, and if younger trees are started to replace the losses, they never quite catch up, so that the uniformity of the planting is lost. Streets being, as they are, formal creations of man, it is evident that their ideal expression is formality, and to harmonize with this formality, tree planting, unless presenting great uniformity, mars rather than enhances a street's beauty.

Trees not to use.

Considering all these things, it would seem that for such streets the obvious ideal is a tree which will stand the adverse conditions and meet the requirements of good design. Such a tree should stand growing in small root compass in a sort of a flower-pot of soil, beneath an iron grating. It should be small, carry its head low, sufficient to give shade on the sidewalk beneath, without spreading across the street and shutting out the air and light. It should also be a tree which can be moved easily at maturity, so that dead or unhealthy trees may be readily replaced, thus causing no break in the uniformity of the tree lines.

Nature of tree to use.

A tree which fulfills all these requirements is found in the horse chestnut, used so much in Europe. These trees, besides meeting the above conditions, are very formal and blend well with the architectural lines, and by concealing the lower stories, which, on account of business conditions, must necessarily be diverse, they also increase the architectural effect.

Tree recommended.

In recommending the horse chestnut for such use, it should be borne in mind that the tree is not recommended for *residence streets*, where it is so much used. On *residence streets* it is not at all a suitable tree.

Horse chestnuts not for residence streets.

Its dense shade prevents the growth of grass on the parking beneath, while its crops of nuts and burrs form unsightly litter, besides attracting boys who throw sticks and stones into its foliage or break its branches in pursuit of the nuts. Then, again, the foliage turns color early in dry seasons. On business thoroughfares, growing beneath gratings in the pavement, its shade is, of course, no drawback. Also adequate police supervision in such districts prevents injury by boys, and the constant care by street cleaners easily keeps the nuts and burrs from becoming a nuisance.

The accompanying diagrams, Numbers 1 and 2, illustrate the advantage of this European method of small tree planting over ours for business streets.

Formal open places.

Another type of tree planting which may be considered under class one is that of formal open spaces in business sections, such as the civic centers around which public buildings are grouped. The conditions here are similar to those of business streets, and the low and formal type of tree planting, to blend well with the architectural composition, is obviously the ideal. Among existing examples of the treatment of such open places, in a more or less formal manner, are the Trocadero and Place de la Concord, in Paris, and the Opern Platz before the Royal Library in Berlin.

**(2)
Formal avenues.**

Conditions.

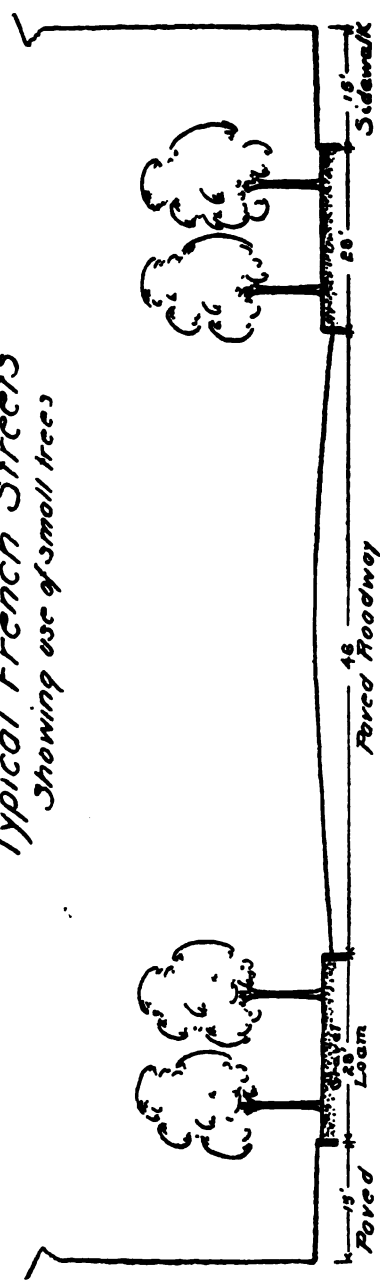
Trees suggested.

Second. Formal Avenues. In streets of this class, the architectural design is of great importance, and so a break in the tree lines affecting the composition is even more serious than in the purely business streets. Such streets being very broad, usually permit of good-sized parking areas, so that there is more range in the trees which may be selected. For the best results medium-sized trees of hardy and more or less formal character are found in the Norway and hard maple, Oriental plane, English elm, linden, etc. Here, as in the case of smaller trees, the city should maintain nurseries, from which full-grown specimens may be had at any time to replace breaks in the planting. For such streets, wide-spreading trees of more or less picturesque growth, like the elm or oak, should not be used, since they do not blend well with the formal expression, and conceal too much of the architecture.

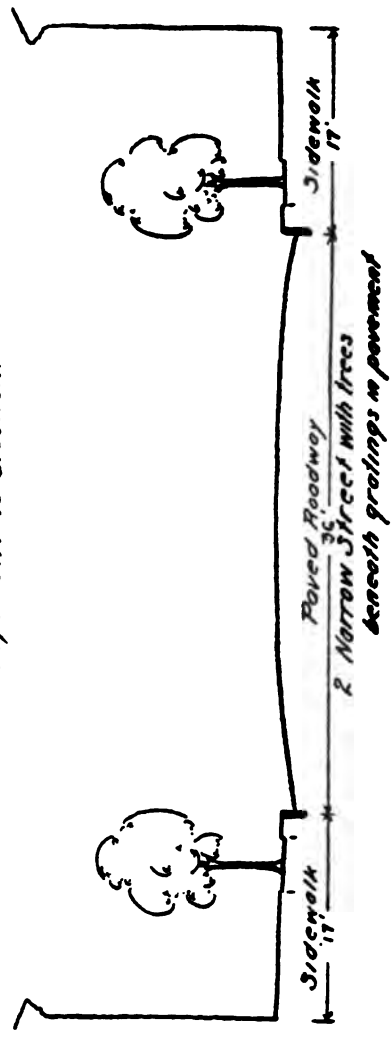
Avenues with different varieties of trees.

Special kinds of trees are occasionally employed for the treatment of such avenues; trees made possible by varying climatic conditions, and which give a unique and peculiar character to the street. There are numerous examples of such avenues, both here and abroad, which

Typical French Streets *Showing use of small trees*



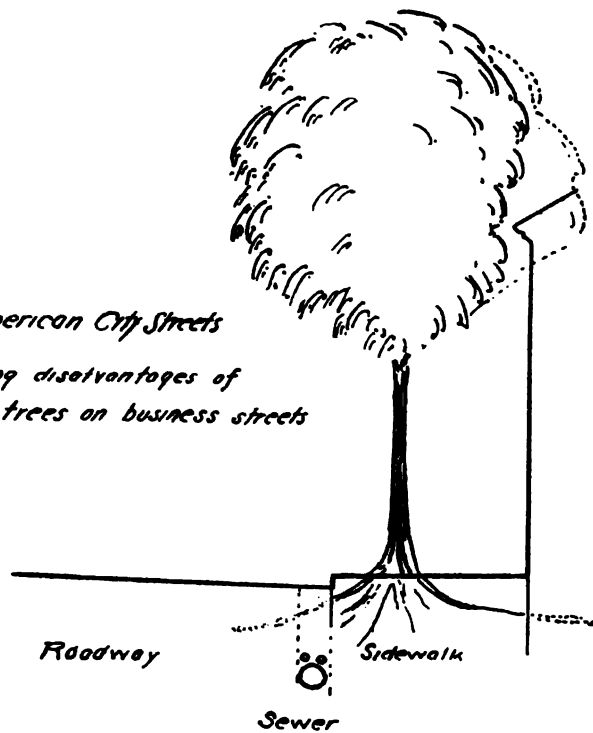
1. Wide Streets with gravel area adjacent to sidewalk



2. Narrow Street with trees beneath gratings in pavement

3. Elms on American City Streets

*Showing disadvantages of
large trees on business streets*



*Dotted Lines Show normal
branch and root growth
hindered by city conditions*

people will travel far to see, and once seeing, will remember long after the rest of the city is forgotten. Two American examples, notable because of their unique characters, are the Avenue of Magnolias in Riverside, California, and the Avenue of Ginkgo trees on the Mall in Washington.

In considering streets of both the foregoing classes nothing has been said concerning the placement or arrangement of the trees. This phase should bear a direct relation to the kind of tree used, width of the thoroughfare, and the effect sought in the general scheme. Taking into account the spread of any particular street tree, the placing should be done so as to prevent crowding. They can be placed reasonably close together, where a continuous mass of foliage is wanted, rather than a succession of individual tree units. On wide streets these trees can be planted opposite each other, while on narrow ways, they interfere less when planted alternately.

Planting as regards design.

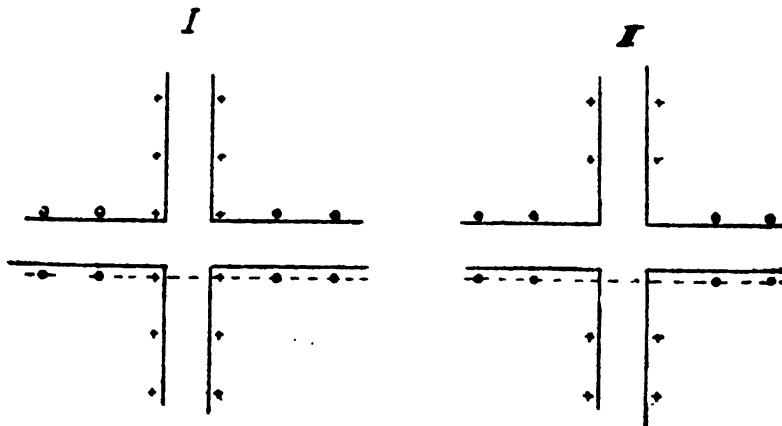
When the streets or avenues are of great width, several rows of trees may be used with good effect. There are numerous methods of such arrangement, as illustrated in examples like the Champs Elysses in Paris, the Ring Strasse in Vienna, the Operng at Wien, Unter dem Linden in Berlin, Commonwealth Avenue in Boston, and numerous other examples, both in America and Europe.

Third. Residential Streets. On streets of the third class we have greatly changed conditions and much more freedom in the use of our trees. Uniformity is not so essential, and the kind and size of tree to be used permit variation. On residential streets, where it is wholly probable that greater traffic will take place with the growth of the city, some provision should be made, when possible, for the widening of the thoroughfare. The customary method of street tree planting is to place the trees in the parking area between the sidewalk and roadway. To widen these streets means the transplanting or destruction of the shade trees. On such streets the sidewalk should adjoin the roadway, and the parking be on the inside adjoining the private properties; or more commonly perhaps, leave the parking area in turf, placing the trees on the property side of the walk. In widening, the sidewalk can be moved and placed on the other side of the planting strip with no damage to existing plantations, or in the other alternative, the curb can be taken right up to the sidewalk, increasing the width of the roadway by double the width of the parking strip. Planting of nearby streets should differ from each other, nothing

**(3)
Residential streets.**

Conditions.

being so monotonous, especially in flat cities, as street after street with long stretching lines of absolutely similar trees. And in order that this may count for the most, great care should be taken with the location of the immediate trees at street intersections. If trees are placed at the four corners this must necessitate the intrusion of one specie within the ranks of the other, breaking up that continuity which is so important in regularly spaced street tree planting. This can be avoided by keeping the trees back from the intersection far enough to allow for adequate spread, and still be off the line. By reference to the diagrams, it will be seen that to preserve uni-



formity of specie, the second arrangement must be followed. This is especially noticeable when trees with little or no character and dignity, such as Carolina poplar, soft maple, catalpa, etc., are used.

**Unfortunate
are Carolina
Poplars.**

**Correct uses
of Poplars.**

Many cities of the west and the middle west suffer from a severe attack of Carolina poplaritis. The cheapness and quick-growing qualities of this tree have brought it into undeserved favor, just as similar conditions have brought the soft maple and the cottonwood into favor in the irrigated cities. There are people who consider the Carolina poplar a first-class street tree, but aside from the monotonous and rather gloomy expression, its short-lived qualities and dense, damp shade are against it. Fortunately, it is its own antidote, and fifteen years or so removes it. For quick results this tree has its use, and may often be planted for immediate effect, while slower-growing trees are maturing. The danger, however, of this practice is that the poplar, or other rapid growing trees are not cut out soon enough and consequently neither tree does well. When planted alone its cheapness

is a false consideration, for having to be replaced in a short period of years, the final cost is greater than that of more enduring trees.

On residence streets the elm really comes to its own and is an ideal tree for such use. Here the streets are usually wide, and the buildings sufficiently low, so that the shade of the trees being carried above allows the free circulation of air and light beneath the foliage. Other trees advisable for such streets are the Norway and hard maples, Oriental plane, red, black and pin oaks, English elm, linden and like trees.

Tree suggested.

Fourth. Parkways and Boulevards. Just as the chief element in class one is utilitarian, so here the main consideration is aesthetic. The conditions of growth being of the best, any tree which is desired may be grown successfully. From the point of design, these boulevards or parkways are either formal or informal and the tree planting evidently must correspond. For the formal types, the trees, besides being regular in arrangement, should be more or less formal in character, while for the naturalistic roadways, an informal grouping is logical. In the latter case, the trees may be used either singly or in clumps, and in such planting, the failure of one or more trees in no way injures the design, nor does the presence of small trees or younger trees growing to replace older ones, detract. Such informality rather increases this picturesque type of beauty.

**(4)
Parkways
and
Boulevards.**

**Informal
planting.**

It has been advocated by some authorities that this informal planting should be applied to formal streets and avenues, but such treatment is absolutely contrary to the expression of a formal street or avenue, and cannot be seriously considered in connection with good design. It can, however, be used to advantage on straight urban streets. Trees can be planted irregularly here and there, shifting from one side of the street to the other, or perhaps more often, no tree planting at all within the street proper, but irregular masses of tree foliage leaning out into the street over garden walls. They not only provide shade and a frame to the thoroughfare, but tend to break the rigidity of the building lines.

**Where not
to use.**

Among the suitable trees for boulevard use in this climate are the American or English elm, the American and European beeches, Norway and hard maples, locust, tulip, red, black, scarlet, pin and white oaks, hawthornes, white, river and black birches, etc.

**Trees
suggested.**

would greatly improve such streets to have trees spaced at not less than fifty-foot intervals and alternately placed on the opposite sides of the street, as illustrated in diagrams 8 and 9.

**Difficulty
of future
thinning.**

Sometimes trees are planted closely for immediate effect, but this is a dangerous practice, as when the time arrives for thinning, public outcry against sacrificing the trees may very likely prevent its execution.

**Spacing for
different
varieties.**

The normal spacing of trees on streets of ordinary width depends on the variety of tree used. Elms and oaks should never be planted at less than thirty-five-foot intervals, while fifty feet is better. Maples, planes, etc., may be planted from thirty-five to forty feet apart, poplars not closer than twenty-five feet, and horse chestnuts twenty feet.

**Size of trees
to plant.**

The question as to what constitutes the most efficient size of tree to plant is a variable one. If large trees are planted much time is saved and an immediate effect is secured, but they take hold slowly, and it is doubtful if they ever make as healthy trees as when smaller ones are used. For the best results, most trees should be planted when not over two or three inches in diameter, but if the city owns its nursery and the trees are carefully root pruned, they may be used up to eight or twelve inches in diameter with success.

CARE AND PROTECTION.

After the trees have been selected and planted they must still remain a constant care if they are to continue successfully. Abuse, insects, disease, and physical injuries must all be guarded against.

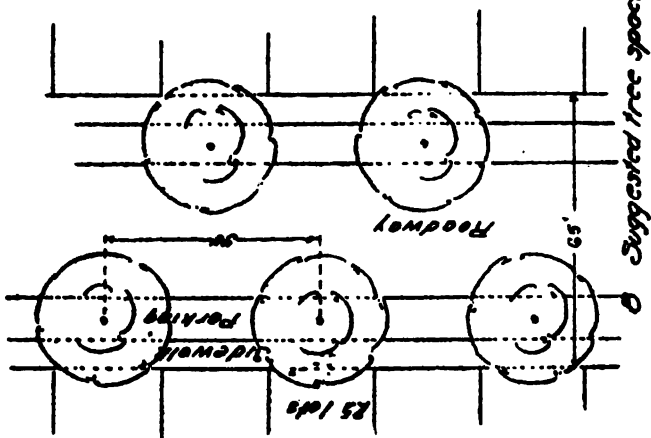
**Need of
public
interest.**

In great part, such care and oversight must come from the city tree authorities, or whatever method of control may be practiced, but it should be borne in mind that the tree laws of any community cannot be thoroughly effective unless the public is familiar both with the regulations themselves and with the sources of injury which they seek to prevent.

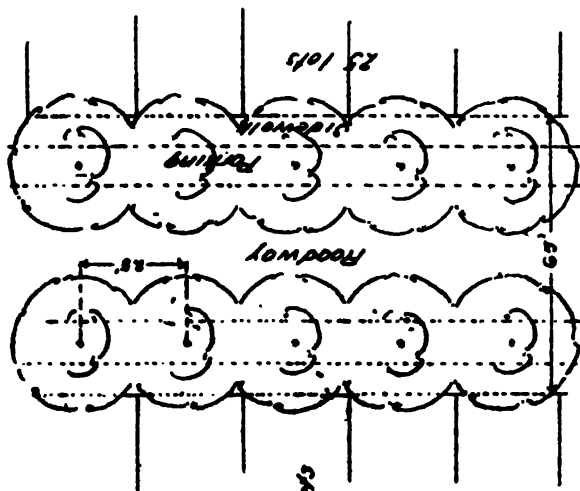
**Sources of
injury.**

The sources of injuries are various, those which are easily preventable being those caused by misuse or neglect. In country and suburban districts, as well as within the city itself, the ruthless work of telephone and electric light companies, in clearing the way for their

Spacing for City Trees



Q Suggested tree spacing



9 Present median spacing

Suggested treatment
of East and West streets

wires, have done much to seriously and permanently disfigure many valuable trees. Such outlying roads, especially on the outskirts of cities and towns, sooner or later become suburban streets. The trees capable of furnishing a valuable adjunct to such streets very often are found injured beyond redemption and must be cut down and replaced by younger trees at a great loss of both time and money.

**Use of
nails.**

The custom of nailing advertising posters and signboards to trees is another fruitful source of injury. Not only do the signs belittle the imposing effect of the tree, but more or less harm is done to the bark, which gives chance for disease to enter and ultimately destroy the tree. Again valuable trees are often sacrificed by tree movers. To remedy these evils there should be a law forbidding all tree cutting or mutilating except by special permit from the park authorities of the city, county or state having charge of the district.

**Construction
work.**

Many injuries occur to trees in the course of construction work. Here lumber, brick, etc., may be piled around the tree trunks, guy wires improperly attached or grading carried on over the roots.

Bruising.

The piling of lumber or bricks, etc., around trees injures and bruises the bark, and thus permits easy access for rot, decay and the various fungous diseases.

If guy wires are attached directly to trees their pressure causes them to cut into the bark and so shut off the supply of sap in the inner cambium layers and cause death. If small strips of wood be placed between the wires and the bark, the pressure is distributed, and injury to the inner bark is lessened. See diagram 6.

Girdling.

Girdling also occurs when iron bands are placed around trees to prevent the splitting off of branches. This purpose may be equally effected by iron rods without danger to the tree. See diagram 5.

Grading.

Where filling must be done around trees, great care should be exercised, since it is not generally known that to raise the grade more than three or four inches around the base of a tree will often kill it. This results not so much from filling against the trunk as from the change of soil moisture and aeration at the roots. Therefore, where possible, trees should be moved to meet the new grade, and, if not, the tree should be welled around. See diagram 7. Or even better, porous filling, drainage, and

the supply of air by frequent shafts (dry wells or otherwise) extending from the old to the new surface will do, and is far less unsightly. Property owners, if cognizant of all these dangers, can in large measure prevent them on the part of contractors, either by expostulation or by obtaining from the court an injunction until the proper investigation can be made by the city authorities.

Ignorance and carelessness are responsible for many injuries to trees, often even in connection with trees which are within the cities' own control. This is most commonly shown in the treatment of trees growing in the sidewalks. Pavement above the roots, even when an unpaved area of a foot or more on all sides is left, shuts out the water supply, causing serious injury or even death. A tree's roots spread nearly as far as its branches, and it should receive water over a correspondingly large area. There are many splendid trees being slowly killed in this manner. That this damage is due to ignorance and might often be guarded against by more general knowledge of tree conditions, is shown by a specific instance which recently came to my notice. A prominent citizen living in a middle western town, a man noted for his civic pride, caused a sidewalk pavement to be carried entirely over the roots of some splendid elms, thus sealing in the roots and killing several fine trees.

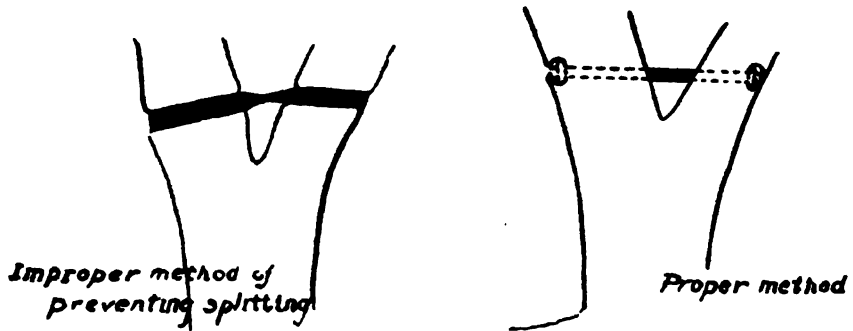
Injury.

Where narrow streets demand that traffic must be carried over the roots of trees, iron gratings, which will permit the water to reach the roots, should be used in place of pavement, care being taken that the ring around the trunk be kept sufficiently large to prevent girdling. A clever form of such grating is that used around the two elms in the Shaw Memorial in Boston. This is formed by a number of iron rods forming an outside ring, which radiate in towards the tree. Thus, in the event of the tree growing over the rods, the spaces between will prevent girdling. See diagram 4. A similar form of grating is much used in France and Germany. Where small-sized trees are planted, a one-piece grating may be used, provided the central ring is large enough to permit future growth of the tree.

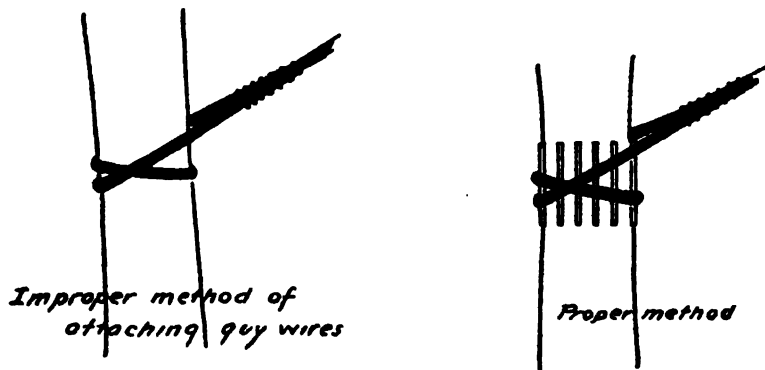
**Tree
gratings.**

A source of damage to trees, rather little known, is that caused by putting on cotton, soaked in kerosene, as a protection against caterpillars. The oil blisters the inner bark, causing the outer bark to drop off a year or two later. A great many valuable elms have recently been injured in this way in fighting the Brown-tail and Tussock moths.

5 Girdling

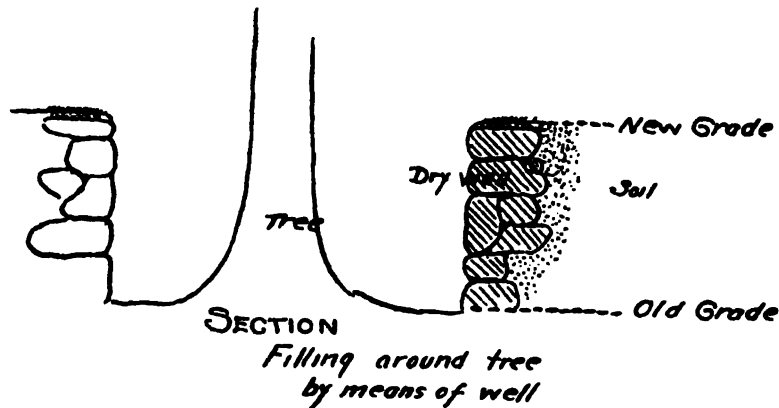


6 Guy Wires



20

7. Grading



The injuries caused by insects and disease, being more conspicuous, are better understood, and already much has been done to combat them. All trees should be inspected both spring and fall, the diseased portions removed, and insect nests and cocoons destroyed. To guard against the various rusts, mildews, leaf blisters, etc., the dead leaves from neglected trees should be gathered in the fall and burned. In addition, one or more sprayings should be given in the spring or early summer, and special spraying when insect pests, like the Tussock moth, Brown-tail, etc., are to be guarded against. All spraying should be in charge of a man thoroughly familiar with the diseases and habits of the insect pests peculiar to the various trees.

**Insects
and
disease.**

**Bi-annual
inspection.**

Bands or straps placed around the trunks of trees early in the spring provide a considerable check to the ravages of caterpillars and various insect larvae. Elm trees may be largely saved from the elm beetle and Tussock caterpillar by the use of bands of sticky substance placed three or four feet from the ground which prevent the ascent of the wingless female.

**Insect
band.**

PRUNING.

Judicious pruning may do much to improve the appearance and health of many trees. Some trees like the poplars are soon killed by excessive pruning. Hornbeams and Oriental planes will stand much pruning, and may, if desired, be trained into formal effects for street work. This is often done in Europe and effective examples are seen in some French Avenues and in the clipped tree canopies of the Swiss villages. Pruning may be done at the time of the fall or spring inspections, and at such times all dead or weak branches should be removed, unsymmetrical and excessive growth corrected, and where root conditions are poor, the balance between root and branch growth carefully kept. The wounds made by such pruning should be treated with paint or tar. Pruning for formal effects may be done throughout the year, as required.

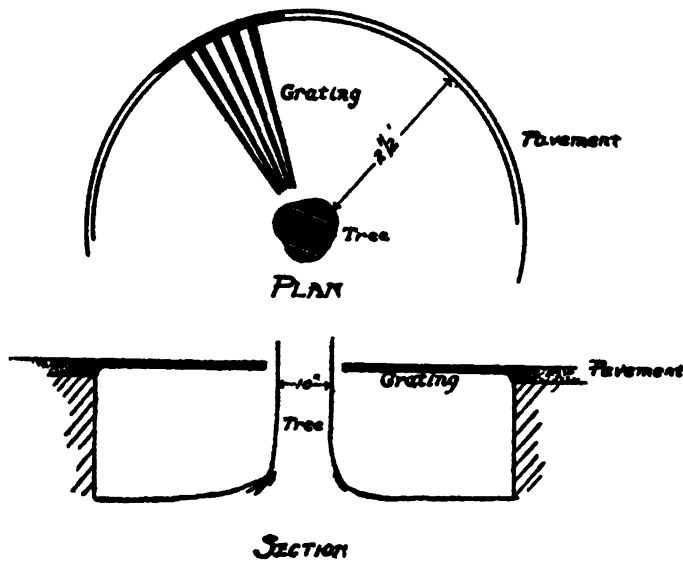
Expert supervision of pruning.

It is important that all pruning operations, like the spraying or planting, should be under expert supervision. Trees should never, except in the case of young specimens, or when thinned out, be pruned from the top, as is so often done, in order to stimulate head growth. This custom, no doubt, arose in the old days when trees were brought from the woods to be planted in the open. Such trees having grown in shade and closely crowded, had put forth top growth at the expense of side growth. When moved into the open with different conditions the long leader was of necessity pruned off to restore the tendency of side growth and give a compact and bushy head. Where trees are grown in nurseries as most street trees are today, and there properly pruned, it is unnecessary to prune when transplanting, except to round out the head or cut back excessive root growth.

If the tops of trees are cut back, the natural effect is lost and the beauty destroyed. Thin out, but do not mutilate.

Pruning broken trees.

An interesting form of pruning is the severe tree surgery which may be used when trees have been badly shattered by wind storms. In such cases three-quarters or more of the head may be pruned off, to remove injured portions and restore symmetry. Such trees, of course, never quite regain their original beauty, but it is often much better to do this than to cut down the tree and lose a valuable landmark. There are some fine examples of old trees in the Arnold Arboretum, Jamaica Plains, Mass., which Dr. Sargent has restored in this manner after serious hurricane damage was done.



4 Tree Grating

In addition to the general care, pruning, etc., young trees should be protected by tree guards from injuries by animals or people. Injuries to young trees not only mar their beauty, but provide spots at which many years afterwards disease may find entrance.

Tree guards.

LEGISLATION AND CONTROL.

In order that all the ideas of city tree planting, as are herein recommended, may be carried from the theoretical into actual practice, it is necessary that there be some general oversight by the city, and the whole matter controlled by some central authority.

Uniform control necessary.

To quote from Charles R. Lamb, Secretary of the American Tree Planting Association:

"There will, however, never be a satisfactory planted street in our city or in any other until either the very autocratic system of a centralized government, like Washington, is followed, or the laws are so recast that a city itself can (under proper regulations) authorize the planting of trees throughout an entire street, indicating the regular points along the sidewalk for such planting, controlling the selection of the trees as to those best adapted to thrive under city conditions, and finally making the charge for the trees, either as an assessment against the property in front of which the trees stand, or a general assessment against all the property along the street so beautified."

Central authority.

**Park
Commissioner.**

There are different methods of exercising such control, depending altogether upon the park organization of the city. Such control should be in the hands of park authorities, whether a park board as in some cities, or commissioner. Where there are a number of commissioners it would be advisable perhaps to have a sub-committee of forestry to have charge of the tree-planting department. The work would in all cases be carried on by an annual appropriation included in the park budget. A forester or superintendent should be employed, who should have in charge all matters of care, planting, combat of diseases, etc., and professional advice in the matter of design could be furnished by the landscape architect retained by the city.

**His
authority.**

The authority of the commissioner or committee should be absolute in deciding how, where, and what trees should be planted on all streets, boulevards, squares, playgrounds, parks and parkways. Also he would have power to thin existing growths of trees which are too crowded, and to remove undesirable tree plantings and replace them with more suitable ones. The commissioner or committee would further have power to compel private owners to follow out the established policy of a street in regard to kind, size, and spacing of trees, and to comply with proper planting regulations and care. He would also dictate what trees shall be planted by real estate companies upon new allotments before such shall be received into the city limits. He would have the oversight of all combat of disease, pruning, spraying, etc., and where private owners do not take proper care of their trees, he should be able to have all trees cared for at the owner's expense.

**A city
nursery.**

It is also suggested that the city maintain its own nurseries for the propagation and growth of trees and shrubs for street, boulevard and park use. Immediate effects can be thus secured at a greatly reduced cost. The benefits accruing from such a city nursery would be not only to insure the kinds of trees which are in harmony with the general scheme of city planting, but also to assure vigorous and healthy trees and proper care and attention during the early stages of growth.

The existing evil of high street tree mortality can be greatly reduced by obtaining nursery grown trees in preference to those collected from the woods by tree movers. Nursery grown trees being properly root pruned can be transplanted without great loss. On the contrary, large trees brought from the woods can only

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